

## **ABSTRACT**

A composite beamforming technique is provided wherein a first communication device has a plurality of antennas and the second communication has a plurality of  
5 antennas. When the first communication device transmits to the second communication device, the transmit signal is multiplied by a transmit weight vector for transmission by each the plurality of antennas and the transmit signals are received by the plurality of antennas at the second communication device. The second communication device determines the best receive weight vector for the its antennas, and from that vector,  
10 derives a suitable transmit weight vector for transmission on the plurality of antennas back to the first communication device. Several techniques are provided to determine the optimum transmit weight vector and receive weight vector for communication between the first and second communication devices so that there is effectively joint or composite beamforming between the communication devices.

15